EXHIBIT 13

Dictionary of

Computer and

Internet Terms

Ninth Edition

Douglas A. Downing, Ph.D.
School of Business and Economics
Seattle Pacific University

Michael A. Covington, Ph.D.
Artificial Intelligence Center
The University of Georgia

Melody Mauldin Covington
Covington Innovations
Athens, Georgia

With the assistance of
Catherine Anne Covington

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ABOUT THE AUTHORS

Douglas Downing teaches economics and quantitative methods and is undergraduate program director for the School of Business and Economics at Seattle Pacific University. He is the author of several books in both Barron's Easy Way and Business Review series. He is also the author of *Java Programming the Easy Way* and *Dictionary of Mathematics Terms*, published by Barron's Educational Series, Inc. He holds the Ph.D. degree in economics from Yale University.

Michael Covington is Associate Director of the Artificial Intelligence Center at the University of Georgia. He is the author of several books and over 250 magazine articles. He holds the Ph.D. degree in linguistics from Yale University.

Melody Mauldin Covington is a graphic designer living in Athens, Georgia. She is the author of *Dictionary of Desktop Publishing* (published by Barron's).

Catherine Anne Covington is a student and web designer in Athens, Georgia.

D

DAC, D/A converter *see* DIGITAL-TO-ANALOG CONVERTER.

daemon (under UNIX) a program that runs continuously in the background, or is activated by a particular event. The word *daemon* is Greek for "spirit" or "soul."

dagger the character †, sometimes used to mark footnotes. *See also* FOOTNOTE. Also called an OBELISK or LONG CROSS.

daisy-chain to connect devices together in sequence with cables. For example, if four devices A, B, C, and D are daisy-chained, there will be a cable from A to B, a cable from B to C, and a cable from C to D.

daisywheel printer a printer that uses a rotating plastic wheel as a type element. Daisywheel printers were often used with microcomputers in the early 1980s. They printed high-quality text, but they were relatively slow and could not print graphics.

dash (—) a punctuation mark similar to a hyphen, but longer. On a typewriter, a dash is typed as two hyphens.

Proportional-pitch type often includes one or more kinds of dashes, such as an em dash (—), which is as wide as the height of the font, and an en dash (–), which is two-thirds as wide as the em dash. Normally, the em dash joins sentences and the en dash joins numbers (as in "1995–98").

data information. The word was originally the plural of *datum*, which means "a single fact," but it is now often used as a collective singular. Data processing is the act of using data for making calculations or decisions. *Usage note:* This usage came and went.

database a collection of data stored on a computer storage medium, such as a disk, that can be used for more than one purpose. For example, a firm that maintains a database containing information on its employees will be able to use the same data for payroll, personnel, and other purposes. *See* DATABASE MANAGEMENT.

database management the task of storing data in a database and retrieving information from that data. There are three aspects of database management: entering data, modifying or updating data, and presenting output reports. Many mainframe computers are used by businesses for database management purposes. Several software packages are available for database management on microcomputers, such as dBASE and Microsoft Access, and some data management capabilities are provided with spreadsheets such as Lotus 1-2-3 and Excel. Some examples of database applications include maintaining employee lists and preparing payrolls; maintaining parts order lists and keeping

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On the cover: Representation of a fullerene molecule with a noble gas atom trapped inside. At the Permian-Triassic sedimentary boundary the noble gases helium and argon have been found trapped inside fullerenes. They exhibit isotope ratios quite similar to those found in meteorites, suggesting that a fireball meteorite or asteroid exploded when it hit the Earth, causing major changes in the environment. *(Image copyright © Dr. Luann Becker. Reproduced with permission.)*

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anaconda [VERT ZOO] *Eunectes murinus.* The largest living snake, an arboreal-aquatic member of the boa family (Boidae). { ‚an·ə'kän·də }

anacoustic zone [GEOPHYS] The zone of silence in space, starting at about 100 miles (160 kilometers) altitude, where the distance between air molecules is greater than the wavelength of sound, and sound waves can no longer be propagated. { ¦an·ə¦kü·stik ‚zōn }

Anactinochitinosi [INV ZOO] A group name for three closely related suborders of mites and ticks: Onychopalpida, Mesostigmata, and Ixodides. { ə¦nak·tə·nə¦kīt·ən'ō‚sī }

Anacystis [BOT] A genus of blue-green algae in the class Cyanophycea. { ‚an·ə'sis·təs }

anadromous [VERT ZOO] Said of a fish, such as the salmon and shad, that ascends fresh-water streams from the sea to spawn. { ə'na·drə·məs }

Anadyomenaceae [BOT] A family of green marine algae in the order Siphonocladales characterized by the expanded blades of the thallus. { ə‚na·dyə‚men'ās·ē‚ē }

anaerobe [BIOL] An organism that does not require air or free oxygen to maintain its life processes. { 'an·ə‚rōb }

anaerobic adhesive [MATER] A single-component adhesive that hardens rapidly to form a strong bond between surfaces from which air is excluded. { ¦an·ə¦rōb·ik əd'hēz·iv }

anaerobic bacteria [MICROBIO] Any bacteria that can survive in the partial or complete absence of air; two types are facultative and obligate. { ¦an·ə¦rōb·ik ‚bak'tir·ē·ə }

anaerobic condition [BIOL] The absence of oxygen, preventing normal life for organisms that depend on oxygen. { ¦an·ə¦rōb·ik kən'dish·ən }

anaerobic glycolysis [BIOCHEM] A metabolic pathway in plants by which, in the absence of oxygen, hexose is broken down to lactic acid and ethanol with some adenosinetriphosphate synthesis. { ¦an·ə¦rōb·ik glī'käl·ə·səs }

anaerobic petri dish [MICROBIO] A glass laboratory dish for plate cultures of anaerobic bacteria; a thioglycollate agar medium and restricted air space give proper conditions. { ¦an·ə¦rōb·ik 'pē·trē ‚dish }

anaerobic process [SCI TECH] A process from which air or oxygen not in chemical combination is excluded. { ¦an·ə¦rōb·ik 'präs·əs }

anaerobic sediment [GEOL] A highly organic sediment formed in the absence or near absence of oxygen in water that is rich in hydrogen sulfide. { ¦an·ə¦rōb·ik 'sed·ə·mənt }

anaerobiosis [BIOL] A mode of life carried on in the absence of molecular oxygen. { ‚an·ə‚rō'bī·ə·səs }

anaerophyte [ECOL] A plant that does not need free oxygen for respiration. { ə'ner·ə‚fīt }

anafront [METEOROL] A front at which the warm air is ascending the frontal surface up to high altitudes. { 'an·ə‚frənt }

anagen effluvium [MED] Acute hair loss that usually follows chemotherapy or radiotherapy. { ¦an·ə·jən ə¦flü·vē·əm }

anaglyph [GRAPHICS] **1.** A stereogram in which the two views are printed or projected superimposed in complementary colors, usually red and blue; by viewing through filter spectacles of corresponding complementary colors, a stereoscopic image is formed. **2.** A surface worked in low relief. { 'an·ə‚glif }

anagyrine [ORG CHEM] $C_{15}H_{20}N_2O$ A toxic alkaloid found in several species of *Lupinus* in the western United States; acute poisoning produces nervousness, depression, loss of muscular control, convulsions, and coma. { ‚an·ə'jī‚rēn }

anakinesis [BIOCHEM] A process in living organisms by which energy-rich molecules, such as adenosine triphosphate, are formed. { ‚an·ə·kə'nē·səs }

anal [ANAT] Relating to or located near the anus. { 'ān·əl }

analbite [MINERAL] A triclinic albite which is not stable and becomes monoclinic at about 700°C. { ə'nal‚bīt }

analbuminemia [MED] A disorder transmitted as an autosomal recessive, characterized by drastic reduction or absence of serum albumin. { ¦an‚al‚byü·mə¦nēm·ē·ə }

anal character [PSYCH] A personality type that exhibits excessive orderliness, miserliness, and obstinacy. { 'ān·əl 'kar·ik·tər }

analcime [MINERAL] $NaAlSi_2O_6 \cdot H_2O$ A white or slightly colored isometric zeolite found in diabase and in alkali-rich basalts. Also known as analcite. { ə'nal‚sēm }

analcimite [PETR] An extrusive or hypabyssal rock that consists primarily of pyroxene and analcime. { ə'nal·sə‚mīt }

analcimization [GEOL] The replacement in igneous rock of feldspars or feldspathoids by analcime. { ə¦nal·sə·mə¦zā·shən }

analcite *See* analcime. { ə'nal‚sīt }

analemma [ASTRON] A figure-eight-shaped diagram on a globe showing the declination of the sun throughout the year and also the equation of time. [CIV ENG] Any raised construction which serves as a support or rest. { ‚an·ə'lem·ə }

analeptic [PHARM] Any drug used to restore respiration and a wakeful state. { ¦an·ə¦lep·tik }

anal fin [VERT ZOO] An unpaired fin located medially on the posterior ventral part of the fish body. { 'ān·əl ‚fin }

analgesia [PHYSIO] Insensibility to pain with no loss of consciousness. { ‚an·əl'jēzh·ə }

analgesic [PHARM] Any drug, such as salicylates, morphine, or opiates, used primarily for the relief of pain. { ‚an·əl'jēz·ik }

anal gland [INV ZOO] A gland in certain mollusks that secretes a purple substance. [VERT ZOO] A gland located near the anus or opening into the rectum in many vertebrates. { 'ān·əl ‚gland }

anallagmatic curve [MATH] A curve that is its own inverse curve with respect to some circle. { ə¦nal·ig¦mad·ik 'kərv }

anallobaric center *See* pressure-rise center. { ə¦nal·ə¦bär·ik 'sen·tər }

analog [CHEM] A compound whose structure is similar to that of another compound but whose composition differs by one element. [FOOD ENG] A meat-substitute food manufactured from vegetable ingredients, such as soybeans. [ELECTR] **1.** A physical variable which remains similar to another variable insofar as the proportional relationships are the same over some specified range; for example, a temperature may be represented by a voltage which is its analog. **2.** Pertaining to devices, data, circuits, or systems that operate with variables which are represented by continuously measured voltages or other quantities. [METEOROL] A past large-scale synoptic weather pattern which resembles a given (usually current) situation in its essential characteristics. { 'an·əl‚äg }

analog adder [ELECTR] A device with one output voltage which is a weighted sum of two input voltages. { 'an·əl‚äg 'ad·ər }

analog channel [ELECTR] A channel on which the information transmitted can have any value between the channel limits, such as a voice channel. { 'an·əl‚äg 'chan·əl }

analog communications [COMMUN] System of telecommunications employing a nominally continuous electric signal that varies in frequency, amplitude, or other characteristic, in some direct correlation to nonelectrical information (sound, light, and so on) impressed on a transducer. { 'an·əl‚äg kə‚myü·nə'kā·shənz }

analog comparator [ELECTR] **1.** A comparator that checks digital values to determine whether they are within predetermined upper and lower limits. **2.** A comparator that produces high and low digital output signals when the sum of two analog voltages is positive and negative, respectively. { 'an·əl‚äg kəm'par·əd·ər }

analog computer [COMPUT SCI] A computer in which quantities are represented by physical variables; problem parameters are translated into equivalent mechanical or electrical circuits as an analog for the physical phenomenon being investigated. { 'an·əl‚äg kəm'pyüd·ər }

analog data [COMPUT SCI] Data represented in a continuous form, as contrasted with digital data having discrete values. { 'an·əl‚äg 'dad·ə }

analog-digital computer *See* hybrid computer. { 'an·əl‚äg 'dij·ə·təl kəm‚pyüd·ər }

analog indicator [ELECTR] A device in which the result of a measurement is indicated by a pointer deflection or other visual quantity. { 'an·əl‚äg 'in·də‚kād·ər }

analog monitor [ELECTR] A display unit that accepts only analog signals, which must be converted from digital signals by the computer's video display board. { 'an·əl·äg ‚män·əd·ər }

analog multiplexer [ELECTR] A multiplexer that provides switching of analog input signals to allow use of a common analog-to-digital converter. { 'an·əl‚äg 'məl·tə‚plek·sər }
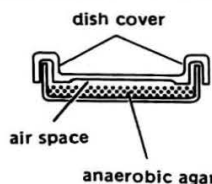
analog multiplier [ELECTR] A device that accepts two or more inputs in analog form and then produces an output proportional to the product of the input quantities. { 'an·əl‚äg 'məl·tə‚plī·ər }

DAT *See* digital audio tape.

data [COMPUT SCI] **1.** General term for numbers, letters, symbols, and analog quantities that serve as input for computer processing. **2.** Any representations of characters or analog quantities to which meaning, if not information, may be assigned. [SCI TECH] Numerical or qualitative values derived from scientific experiments. { 'dad·ə, 'dād·ə, *or* 'däd·ə }

data acquisition [COMMUN] The phase of data handling that begins with the sensing of variables and ends with a magnetic recording or other record of raw data; may include a complete radio telemetering link. { 'dad·ə ,ak·wə,zish·ən }

data acquisition computer [COMPUT SCI] A computer that is used to acquire and analyze data generated by instruments. { 'dad·ə ,ak·wə,zish·ən kəm'pyüd·ər }

data aggregate [COMPUT SCI] The set of data items within a record. { 'dad·ə ,ag·rə·gət }

data analysis [COMPUT SCI] The evaluation of digital data. { 'dad·ə ə,nal·ə·səs }

data attribute [COMPUT SCI] A characteristic of a block of data, such as the type of representation used or the length in characters. { 'dad·ə ¦a·trə'byüt }

data automation [COMPUT SCI] The use of electronic, electromechanical, or mechanical equipment and associated techniques to automatically record, communicate, and process data and to present the resultant information. { ¦dad·ə ȯd·ə'mā·shən }

data bank [COMPUT SCI] A complete collection of information such as contained in automated files, a library, or a set of computer disks. { 'dad·ə ,baŋk }

database [COMPUT SCI] A nonredundant collection of interrelated data items that can be shared and used by several different subsystems. { 'dad·ə,bās }

database/data communication [COMPUT SCI] An advanced software product that combines a database management system with data communications procedures. Abbreviated DB/DC. { 'dad·ə,bās 'dad·ə kə,myü·nə'kā·shən }

database machine [COMPUT SCI] A computer that handles the storage and retrieval of data into and out of a database. { 'dad·ə,bās mə,shēn }

database management system [COMPUT SCI] A special data processing system, or part of a data processing system, which aids in the storage, manipulation, reporting, management, and control of data. Abbreviated DBMS. { 'dad·ə,bās 'man·ij·mənt ,sis·təm }

database server [COMPUT SCI] An independently functioning computer in a local-area network that holds and manages the database. { 'dad·ə,bās ,sər·vər }

data break [COMPUT SCI] A facility which permits input/output transfers to occur without disturbing program execution in a computer. { 'dad·ə ,brāk }

data buffering [COMPUT SCI] The temporary collection and storage of data awaiting further processing in physical storage devices, allowing a computer and its peripheral devices to operate at different speeds. { 'dad·ə ,bəf·ə·riŋ }

data bus [ELECTR] An internal channel that carries data between a computer's central processing unit and its random-access memory. { 'dad·ə ,bəs }

data capture [COMPUT SCI] The acquisition of data to be entered into a computer. { 'dad·ə ,kap·chər }

data carrier [COMPUT SCI] A medium on which data can be recorded, and which is usually easily transportable, such as cards, tape, paper, or disks. { 'dad·ə ,kar·ē·ər }

data carrier storage [COMPUT SCI] Any type of storage in which the storage medium is outside the computer, such as tape, cards, or disks, in contrast to inherent storage. { 'dad·ə ,kar·ē·ər ,stȯr·ij }

data cartridge [COMPUT SCI] A tape cartridge used for nonvolatile and removable data storage in small digital systems. { 'dad·ə ,kar·trij }

data cell drive [COMPUT SCI] A large-capacity storage device consisting of strips of magnetic tape which can be individually transferred to the read-write head. { 'dad·ə ,sel ,drīv }

data center [COMPUT SCI] An organization established primarily to acquire, analyze, process, store, retrieve, and disseminate one or more types of data. { 'dad·ə ,sen·tər }

data chain [COMPUT SCI] Any combination of two or more data elements, data items, data codes, and data abbreviations

in a prescribed sequence to yield meaningful information; for example, "date" consists of data elements year, month, and day. { 'dad·ə ,chān }

data chaining [COMPUT SCI] A technique used in scatter reading or scatter writing in which new storage areas are defined for use as soon as the current data transfer is completed. { 'dad·ə ,chān·iŋ }

data channel [COMPUT SCI] A bidirectional data path between input/output devices and the main memory of a digital computer permitting one or more input/output operations to proceed concurrently with computation. { 'dad·ə ,chan·əl }

data circuit [ELECTR] A telephone facility that allows transmission of digital data pulses with minimum distortion. { 'dad·ə ,sər·kət }

data code [COMPUT SCI] A number, letter, character, symbol, or any combination thereof, used to represent a data item. { 'dad·ə ,kōd }

data collection [COMPUT SCI] The process of sending data to a central point from one or more locations. { 'dad·ə kə,lek·shən }

data communication network [COMPUT SCI] A set of nodes, consisting of computers, terminals, or some type of communication control units in various locations, connected by links consisting of communication channels providing a data path between the nodes. { 'dad·ə kə,myü·nə,kā·shən 'net,wərk }

data communications [COMMUN] The conveying from one location to another by electrical means of information that originates or is recorded in alphabetic, numeric, or pictorial form, or as a signal that represents a measurement; includes telemetering, telegraphy, and facsimile but not voice or television. Also known as data transmission. { 'dad·ə kə,myü·nə'kā·shənz }

data communications processor [COMPUT SCI] A small computer used to control the flow of data between machines and terminals over communications channels. { 'dad·ə kə,myü·nə¦kā·shənz 'präs,es·ər }

data compression [COMPUT SCI] The technique of reducing the number of binary digits required to represent data. { 'dad·ə kəm,presh·ən }

data concentrator [ELECTR] A device, such as a microprocessor, that takes data from several different teletypewriter or other slow-speed lines and feeds them to a single higher-speed line. { 'dad·ə kän·sən,trād·ər }

data conversion [COMPUT SCI] The changing of the representation of data from one form to another, as from binary to decimal, or from one physical recording medium to another, as from card to disk. Also known as conversion. { 'dad·ə kən,vər·zhən }

data conversion line [COMPUT SCI] The channel, electronic or manual, through which data elements are transferred between data banks. { 'dad·ə kən,vər·zhən ,līn }

data converter *See* converter. { 'dad·ə kən,vərd·ər }

data definition [COMPUT SCI] The statements in a computer program that specify the physical attributes of the data to be processed, such as location and quantity of data. { 'dad·ə ,def·ə'nish·ən }

data dependence graph [COMPUT SCI] A chart that represents a program in a data flow language, in which each node is a function and each arc carries a value. { 'dad·ə di,pen·dəns ,graf }

data description language [COMPUT SCI] A programming language used to specify the arrangement of data items within a data base. { 'dad·ə di¦skrip·shən ,laŋ·gwij }

data descriptor [COMPUT SCI] A pointer indicating the memory location of a data item. { 'dad·ə di'skrip·tər }

data dictionary [COMPUT SCI] A catalog which contains the names and structures of all data types. { 'dad·ə ,dik·shə,ner·ē }

data display [COMPUT SCI] Visual presentation of processed data by specially designed electronic or electromechanical devices through interconnection (either on- or off-line) with digital computers or component equipments; although line printers and punch cards may display data, they are not usually categorized as displays but as output equipments. { 'dad·ə di,splā }

data distribution [COMPUT SCI] Data transmission to one or more locations from a central point. { 'dad·ə ,dis·trə,byü·shən }

The quantity of heat passing normally through a unit area per unit time divided by the product of specific heat, density, and temperature gradient. Also known as thermal diffusivity; thermometric conductivity. { dif·yü′ziv·əd·ē }

diffusivity analysis [ANALY CHEM] Analysis of difficult-to-separate materials in solution by diffusion effects, using, for example, dialysis, electrodialysis, interferometry, amperometric titration, polarography, or voltammetry. { dif·yü′ziv·əd·ē ə′nal·ə·səs }

difunctional molecule [ORG CHEM] An organic structure possessing two sites that are highly reactive. { ˌdī′fəŋk·shən·əl ′mäl·ə,kyül }

digallic acid See tannic acid. { dī′gal·ik ′as·əd }

digamma function [MATH] The derivative of the natural logarithm of the gamma function. { dī,gam·ə ,fəŋk·shən }

digastric [ANAT] Of a muscle, having a fleshy part at each end and a tendinous part in the middle. { dī′gas·trik }

Digenea [INV ZOO] A group of parasitic flatworms or flukes constituting a subclass or order of the class Trematoda and having two types of generations in the life cycle. { dī′jē·nē·ə }

digenesis [BIOL] Sexual and asexual reproduction in succession. { dī′jen·ə·səs }

digenite [MINERAL] Cu_9S_5 A blue to black mineral consisting of an isometric copper sulfide having a variable deficiency in copper. Also known as alpha chalcocite; blue chalcocite. { ′dī·jə,nīt }

Di George's syndrome See thymic aplasia. { də′jórj·əz ,sin,drōm }

digested sludge [CIV ENG] Sludge or thickened mixture of sewage solids with water that has been decomposed by anaerobic bacteria. { də′jes·təd ′sləj }

digester [CHEM ENG] A vessel used to produce cellulose pulp from wood chips by cooking under pressure. [CIV ENG] A sludge-digestion tank containing a system of hot water or steam pipes for heating the sludge. { də′jes·tər }

digestion [CHEM ENG] **1.** Preferential dissolving of mineral constituents in concentrations of ore. **2.** Liquefaction of organic waste materials by action of microbes. **3.** Separation of fabric from tires by the use of hot sodium hydroxide. **4.** Removing lignin from wood in manufacture of chemical cellulose paper pulp. [CIV ENG] The process of sewage treatment by the anaerobic decomposition of organic matter. [PHYSIO] The process of converting food to an absorbable form by breaking it down to simpler chemical compounds. { də′jes·chən }

digestive efficiency [ECOL] A measure of the amount of ingested chemical energy actually absorbed by an animal. { dī′jes·tiv i′fish·ən·sē }

digestive enzyme [BIOCHEM] Any enzyme that causes or aids in digestion. { də′jes·tiv ′en,zīm }

digestive gland [PHYSIO] Any structure that secretes digestive enzymes. { də′jes·tiv ,gland }

digestive system [ANAT] A system of structures in which food substances are digested. { də′jes·tiv ,sis·təm }

digestive tract [ANAT] The alimentary canal. { də′jes·tiv ,trakt }

digger [ENG] A tool or apparatus for digging in the ground. [MIN ENG] A person who digs in the ground; usually refers to a coal miner. { ′dig·ər }

digging [ENG] A sudden increase in cutting depth of a cutting tool due to an erratic change in load. { ′dig·iŋ }

digging height See bank height. { ′dig·iŋ ,hīt }

digging line See inhaul cable. { ′dig·iŋ ,līn }

diggings [SCI TECH] **1.** Excavated materials. **2.** A place of excavating. { ′dig·iŋz }

digicitrin [BIOCHEM] $C_{21}H_{21}O_{10}$ A flavone compound that is found in foxglove leaves. { ,dīj·ə′si·trən }

digicom [COMMUN] A wire communication system that transmits speech signals in the form of corresponding trains of pulses and transmits digital information directly from computers, radar, tape readers, teleprinters, and telemetering equipment. { ′dij·ə,käm }

digicon [ELECTR] An image tube in which the image produced by electrons from the photocathode is focused directly on a silicon diode array and each incoming photoelectron produces an electrical pulse that is amplified and recorded. { ′dij·ə,kän }

digit [COMPUT SCI] In a decimal digital computer, the space reserved for storage of one digit of information. [MATH] A

character used to represent one of the nonnegative integers smaller than the base of a system of positional notation. Also known as numeric character. { ′dij·ət }

digit absorbing selector [ELECTR] Dial switch arranged to set up and then fall back on the first one of two digits dialed; it then operates on the next digit dialed. { ′dij·ət əb,sórb·iŋ si′lek·tər }

digital [COMPUT SCI] Pertaining to data in the form of digits. { ′dij·əd·əl }

digital audio broadcasting [COMMUN] The radio broadcasting of audio signals encoded in digital form. Abbreviated DAB. { ˌdij·əd·əl ′ód·ē·ō ′bród,kast·iŋ }

digital audio tape [COMPUT SCI] A magnetic tape on which sound is recorded and played back in digital form. Abbreviated DAT. { ˌdij·əd·əl ′ód·ē·ō ,tāp }

digital camera [ELECTR] A television camera that breaks up a picture into a fixed number of pixels and converts the light intensity (or the intensities of each of the primary colors) in each pixel to one of a finite set of numbers. { ′dij·əd·əl ′kam·rə }

digital channel [COMMUN] A transmission path that carries only digital signals. { ′dij·əd·əl ′chan·əl }

digital chart [NAV] A navigational chart encoded in a computer-usable format and used, in combination with electronic devices, to produce a computer-generated video display which provides the navigator with an accurate pictorial presentation of the information normally gathered from a paper chart. Also known as electronic chart. { ′dij·əd·əl ′chärt }

digital circuit [ELECTR] A circuit designed to respond at input voltages at one of a finite number of levels and, similarly, to produce output voltages at one of a finite number of levels. { ′dij·əd·əl ′sər·kət }

digital circuit multiplication equipment [COMMUN] Equipment that uses digital compression techniques to increase the capacity of digital satellite and cable links carrying voice, facsimile, and voice-frequency modem traffic. { ,dij·əd·əl ,sər·kət ,məl·tə·plə′kā·shən i,kwip·mənt }

digital communications [COMMUN] System of telecommunications employing a nominally discontinuous signal that changes in frequency, amplitude, time, or polarity. { ′dij·əd·əl kə,myü·nə′kā·shənz }

digital comparator [ELECTR] A comparator circuit operating on input signals at discrete levels. Also known as discrete comparator. { ′dij·əd·əl kəm′par·əd·ər }

digital computer [COMPUT SCI] A computer operating on discrete data by performing arithmetic and logic processes on these data. { ′dij·əd·əl kəm′pyüd·ər }

digital control [CONT SYS] The use of digital or discrete technology to maintain conditions in operating systems as close as possible to desired values despite changes in the operating environment. { ′dij·əd·əl kən′trōl }

digital converter [ELECTR] A device that converts voltages to digital form; examples include analog-to-digital converters, pulse-code modulators, encoders, and quantizing encoders. { ′dij·əd·əl kən′vərd·ər }

digital counter [ELECTR] A discrete-state device (one with only a finite number of output conditions) that responds by advancing to its next output condition. { ′dij·əd·əl ′kaūnt·ər }

digital data [COMPUT SCI] Data that are electromagnetically stored in the form of discrete digits. { ′dij·əd·əl ′dad·ə }

Digital Data Broadcast System [NAV] A system that will provide information aiding air-traffic control; digital data to aircraft over vortac channels will carry information on the geographic location, elevation, magnetic variation, and related data of the vortac station being received. Abbreviated DDBS. { ,dij·əd·əl ′dad·ə ′bród,kast ,sis·təm }

digital data modulation system [COMMUN] A digital communications system in which the information source consists of a finite number of discrete messages which are coded into a sequence of waveforms or symbols, each one selected from a specified and finite set. { ′dij·əd·əl ′dad·ə ,mäj·ə′lā·shən ,sis·təm }

digital data recorder [COMPUT SCI] Electronic device that converts continuous electrical analog signals into number (digital) values and records these values onto a data log via a high-speed typewriter. { ′dij·əd·əl ′dad·ə ri,kórd·ər }

digital data service [COMMUN] A telephone communication system developed specifically for digital data, using existing local digital lines combined with data-under-voice

DIGENEA

oral sucker
prepharynx
pharynx
esophagus
cirrus
genital atrium
cirrus sac
ventral sucker
ejaculatory duct
prostate
vagina or metraterm
seminal vesicle
ovary
seminal receptacle
Laurer's canal
vitellaria
vitelline duct
ootype
Mehlis' gland
uterus
vas efferens
testes
intestine
excretory vesicle
excretory pore
distome

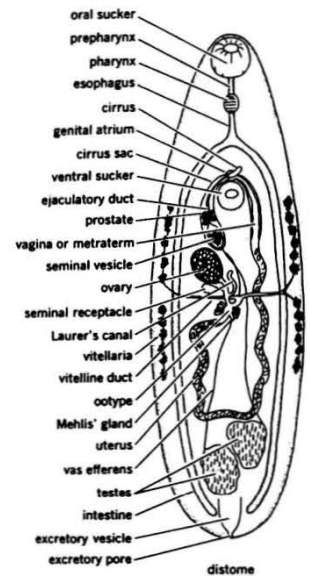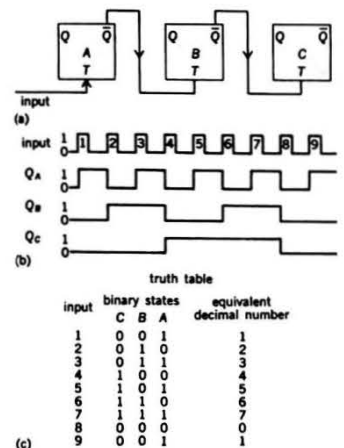Diagram of an adult digenetic trematode. *(From R. M. Cable, An Illustrated Laboratory Manual of Parasitology, Burgess, 1940)*

DIGITAL COUNTER

An octal counter. T stands for trigger input, $\bar{Q}$ and Q represent output terminals, and A, B, and C identify different flip-flop stages. *(a)* Three successive flip-flop stages. *(b)* Input signal and Q-terminal states of each flip-flop. *(c)* Truth table.

Pacific time [ASTRON] The time for a given time zone that is based on the 120th meridian and is the eighth zone west of Greenwich. Also known as Pacific Standard Time. { pə'sif·ik 'tīm }

Pacific-type continental margin [GEOL] A continental margin typified by that of the western Pacific where oceanic lithosphere descends beneath an adjacent continent and produces an intervening island arc system. { pə'sif·ik ˌtīp ˌkänt·ən'ent·əl 'mär·jən }

Pacinian corpuscle [NEUROSCI] An encapsulated lamellar sensory nerve ending that functions as a kinesthetic receptor. { pə'chin·ē·ən 'kȯr·pə·səl }

pack [COMPUT SCI] To reduce the amount of storage required to hold information by changing the method of encoding the data. [IND ENG] To provide protection for an article or group of articles against physical damage during shipment; packing is accomplished by placing articles in a shipping container, and blocking, bracing, and cushioning them when necessary, or by strapping the articles or containers on a pallet or skid. [MIN ENG] 1. A pillar built in the waste area or roadside within a mine to support the mine roof; constructed from loose stones and dirt. 2. Waste rock or timber used to support the roof or underground workings or used to fill excavations. Also known as fill. [OCEANOGR] See pack ice. [ORD] Part of a parachute assembly in which the canopy and shroud lines are folded and carried. Also known as pack assembly. { pak }

package [COMPUT SCI] A program that is written for a general and widely used application in such a way that its usefulness is not impaired by the problems of data or organization of a particular user. { pak·ij }

packaged circuit See rescap. { 'pak·ijd ˌsər·kət }

packaged magnetron [ELECTR] Integral structure comprising a magnetron, its magnetic circuit, and its output matching device. { 'pak·ijd 'mag·nəˌträn }

package freight [IND ENG] Freight shipped in lots insufficient to fill a complete car; billed by the unit instead of by the carload. { 'pak·ij ˌfrāt }

package power reactor [NUC PHYS] A small nuclear power plant designed to be crated in packages small enough for transportation to remote locations. { 'pak·ij 'pau̇·ər rēˌak·tər }

packaging [ELEC] The process of physically locating, connecting, and protecting devices or components. { 'pak·ə·jiŋ }

packaging density [ELECTR] The number of components per unit volume in a working system or subsystem. { 'pak·ə·jiŋ ˌden·səd·ē }

pack artillery [ORD] Artillery weapons designed for transport in sections by animals or delivery by parachute; the weapon and carriage are partially disassembled for transport and reassembled for firing from ground positions. { 'pak arˈtil·ə·rē }

pack assembly See pack. { 'pak əˌsem·blē }

pack builder [MIN ENG] 1. One who builds packs or pack walls. 2. In anthracite and bituminous coal mining, one who fills worked-out rooms, from which coal has been mined, with rock, slate, or other waste to prevent caving of walls and roofs, or who builds rough walls and columns of loose stone, heavy boards, timber, or coal along haulageways and passageways and in rooms where coal is being mined to prevent caving of roof or walls during mining operations. Also known as packer; pillar man; timber packer; waller. { 'pak ˌbild·ər }

pack carburizing [MET] A method of surface hardening of steel in which parts are packed in a steel box with the carburizing compound and heated to elevated temperatures. { 'pak 'kär·bəˌrīz·iŋ }

packed bed [CHEM ENG] A fixed layer of small particles or objects arranged in a vessel to promote intimate contact between gases, vapors, liquids, solids, or various combinations thereof; used in catalysis, ion exchange, sand filtration, distillation, absorption, and mixing. { 'pakt 'bed }

packed decimal [COMPUT SCI] A means of representing two digits per character, to reduce space and increase transmission speed. { 'pakt 'des·məl }

packed file [COMPUT SCI] A file that has been encoded so that it takes up less space in storage. Also known as compressed file. { 'pakt 'fīl }

packed tower [CHEM ENG] A fractionating or absorber tower filled with small objects (packing) to bring about intimate contact between rising fluid (vapor or liquid) and falling liquid. { 'pakt 'tau̇·ər }

packed tube [CHEM ENG] A pipe or tube filled with high-heat-capacity granular material; used to heat gases when tubes are externally heated. { 'pakt 'tüb }

packer [ENG] A device that is inserted into a hole being grouted to prevent return of the grout around the injection pipe. [MIN ENG] See pack builder. [PETRO ENG] See production packer. { 'pak·ər }

packer fluid [PETRO ENG] Fluid inserted in the annulus between the tubing and casing above a packer in order to reduce pressure differentials between the formation and the inside of the casing and across the packer. { 'pak·ər ˌflü·əd }

packer test [PETRO ENG] A pressure test of a sealed zone in a well. { 'pak·ər ˌtest }

packet [BIOL] A cluster of organisms in the form of a cube resulting from cell division in three planes. [COMMUN] A short section of data of fixed length that is transmitted as a unit. [PHYS] See wave packet. { 'pak·ət }

packet gland [INV ZOO] A cluster of gland cells opening through the epidermis of nemertines. { 'pak·ət ˌgland }

packet switching See packet transmission. { 'pak·ət ˌswich·iŋ }

packet transmission [COMMUN] Transmission of standardized packets of data over transmission lines rapidly by networks of high-speed switching computers that have the message packets stored in fast-access core memory. Also known as packet switching. { 'pak·ət tranzˌmish·ən }

pack hardening [MET] A process of heat treating in which the workpiece is packed in a metal box together with carbonaceous material; carbon penetration is proportional to the length of heating; after treatment the workpiece is reheated and quenched. { 'pak ˌhard·ən·iŋ }

pack ice [OCEANOGR] Any area of sea ice, except fast ice, composed of a heterogeneous mixture of ice of varying ages and sizes, and formed by the packing together of pieces of floating ice. Also known as ice canopy; ice pack; pack. { 'pak ˌīs }

packing [CRYSTAL] Arrangement of atoms or ions in a crystal lattice. [ENG] See stuffing. [ENG ACOUS] Excessive crowding of carbon particles in a carbon microphone, produced by excessive pressure or by fusion particles due to excessive current, and causing lowered resistance and sensitivity. [GEOL] The arrangement of solid particles in a sediment or in sedimentary rock. [GRAPHICS] Paper used as a layer under the image or impression cylinder in letterpress printing or under the plate or blanket in lithographic printing in order to produce suitable pressure. [MET] In powder metallurgy, a material in which compacts are embedded during presintering or sintering operations. { 'pak·iŋ }

packing density [COMPUT SCI] The amount of information per unit of storage medium, as characters per inch on tape, bits per inch or drum, or bits per square inch in photographic storage. [ELECTR] The number of devices or gates per unit area of an integrated circuit. [GEOL] A measure of the extent to which the grains of a sedimentary rock occupy the gross volume of the rock in contrast to the spaces between the grains; equal to the cumulative grain-intercept length along a traverse in a thin section. { 'pak·iŋ ˌden·səd·ē }

packing fraction [NUC PHYS] The quantity $(M - A)/A$, where M is the mass of an atom in atomic mass units and A is its atomic number. { 'pak·iŋ ˌfrak·shən }

packing house [FOOD ENG] 1. A food processing plant generally requiring the use of refrigeration. 2. A building in which livestock are slaughtered and processed, and the meat products and by-products are packed. { 'pak·iŋ ˌhau̇s }

packing house pitch [MATER] Dark-brown to black by-product residue from manufacturing soap and candle stock or from refining vegetable oils, refuse, or wool grease; soluble in naphtha and carbon disulfide; used to make paints, varnishes, and tar paper, and in marine caulking and waterproofing. Also known as fatty-acid pitch. { 'pak·iŋ ˌhau̇s ˌpich }

packing index [CRYSTAL] The volume of ion divided by the volume of the unit cell in a crystal. { 'pak·iŋ ˌinˌdeks }

packing proximity [GEOL] In a sedimentary rock, an estimate of the number of grains that are in contact with adjacent grains; equal to the total percentage of grain-to-grain contacts along a traverse measured on a thin section. { 'pak·iŋ präkˌsim·əd·ē }

packing radius [CRYSTAL] One-half the smallest approach distance of atoms or ions. { 'pak·iŋ ˌrād·ē·əs }

HARGRAVE'S
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The Institute of Electrical and Electronics Engineers, Inc., New York

DAMA (1) An acronym from <u>D</u>emand <u>A</u>ssigned <u>M</u>ultiple <u>A</u>ccess. (2) An acronym from <u>D</u>ata <u>A</u>ssigned <u>M</u>ultiple <u>A</u>ccess.

damped response In linear systems including circuits, networks, and mechanical devices, a term describing the system output (response) to an abrupt input stimulus (a step or impulse for example). There are three classifications of response—*critically damped, underdamped,* and *overdamped.*

- *Critically damped*—In response to an abrupt input stimulus, the output of a critically damped system will change in the minimum time possible *without* overshoot or ringing. It is the boundary between an underdamped and overdamped response.
- *Underdamped*—In response to an abrupt input stimulus, the output of an underdamped system has an overshoot and possible ringing. Overshoot is the condition of a signal to exceed the final value when changing from one state to another.
- *Overdamped*—As with a critically damped system, an overdamped system will not have either overshoot or ringing. However, the system output response to an abrupt input signal change will be slower than that of the critically damped system.

A comparison of the three damping conditions is shown in the accompanying figure.
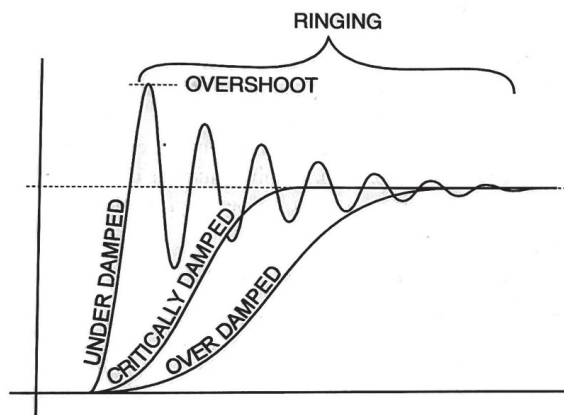
damping The progressive diminishing of specified values characteristic of a phenomenon with respect to time, e.g., the progressive decay in the amplitude of the free oscillations of a circuit with time. See also *damped response.*

damping factor (ζ) A number expressing the ratio of the actual damping to the damping of a critically damped second-order linear system (or subsystem). *Damping factors* less than one are underdamped, while those greater than one are overdamped. See also *damped response.*

DAN An acronym from <u>D</u>epartmental <u>A</u>rea <u>N</u>etwork.

DAP (1) An acronym from <u>D</u>ata <u>A</u>ccess <u>P</u>rotocol. (2) An acronym from <u>D</u>irectory <u>A</u>ccess <u>P</u>rotocol. (3) An acronym from <u>D</u>ocument <u>A</u>pplication <u>P</u>rofile.

dark current In electro-optics, the quiescent current that flows in a photosensitive device when there is no incident radiation.

dark fiber An unused optic fiber. A fiber optic cable not carrying a signal; that is, there is no light energy in the fiber.

DARPA An acronym from <u>D</u>efense <u>A</u>dvanced <u>R</u>esearch <u>P</u>rojects <u>A</u>gency.

DAS (1) An acronym from <u>D</u>ual <u>A</u>ttachment <u>S</u>tation. A device on an FDDI fiber optic ring to which the two rings are attached. (2) An acronym from <u>D</u>ynamically <u>A</u>ssigned <u>S</u>ocket. (3) An acronym from <u>D</u>isk <u>A</u>rray <u>S</u>tation.

DASD An acronym from <u>D</u>irect <u>A</u>ccess <u>S</u>torage <u>D</u>evice (pronounced "DAZ-dee").

DASS (1) An acronym from <u>D</u>istributed <u>A</u>uthentication <u>S</u>ecurity Service. (2) An acronym from <u>D</u>irect <u>A</u>ccess <u>S</u>econdary <u>S</u>torage. Storage facilities that are online but slower than the mainstay hard disk drive.

DASS n A British acronym from <u>D</u>igital <u>A</u>ccess <u>S</u>ignaling <u>S</u>ystem. DASS 1 was the original British Telecom ISDN signaling scheme developed for both single line and multiline Integrated Digital Access (IDA) applications (although it was used only with single lines). DASS 2, also developed by British Telecom, is a message-based signaling system that follows the ISO model and provides multiline access to the British Telecom network.

DassiII A message-based signaling system, following the ISO model, developed by British Telecom (BT), to provide multiline integrated digital access (IDA) interconnection to the BT network.

DAT (1) An acronym from <u>D</u>igital <u>A</u>udio <u>T</u>ape. (2) An acronym from <u>D</u>uplicate <u>A</u>ddress <u>T</u>est.

data A representation of a collection of facts, concepts, instructions, or information to which meaning has been assigned. The representation may be analog, digital, or any symbolic form suitable for storage, communication, interpretation, or processing by human or automatic means.

"Data" is the plural of the Latin *datum,* meaning one item of information. To be correct, a single item should be called a datum and more than one should be called *data,* i.e., "one datum is . . ." and "two *data are* . . ."

data above voice (DAV) See *data over voice.*

data access arrangement (DAA) See *DAA.*

Data Access Language (DAL) In Macintosh-based client–server environments, an extension to the Structured Query Language (SQL) database language intended to provide uniform access to any database that supports SQL.

data access manager (DAM) In the Apple Computer's System 7 operating system software for Macintoshes, *DAM* is a built-in capability for accessing databases on a network. The *DAM* mediates between an application and the database being accessed. It uses database extensions to communicate with the database. These are database-specific system files that contain the commands necessary to interact with a particular database.

data attribute A characteristic of a data element such as length (number of bits or bytes), method of representation (fixed point, floating point, alphanumeric), or value.

data bank A set of data related to a given subject and organized in such a way that it can be accessed and retrieved by local and/or remote users. The databank's characteristics and attributes may include:

- Information on a single subject or multiple subjects.
- Any rational organization (random, sequential, and so on).
- More than one database.
- More than one data bank in order to achieve a complete database.
- May be geographically distributed.

data base See *database.*

data bits In asynchronous communications, the group of 5, 6, 7, or 8 bits following the start bit (7 or 8 bits are most commonly used). These bits represent a single character or symbol for transmission. Following the *data bits* is an optional parity bit and 1, 1.5, or 2 stop bits.

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signal and reduce the frequency depression (especially in Meachem-bridge oscillator with crystal) of the main harmonic by higher harmonics (van der Pol effect). Three types of circuits are used:

1. An element of large inertia (tungsten lamp, thermistor) is included in the circuit at a point where it can change the magnitude of feedback, but not affect the frequency.

2. A controlled resistor (usually an FET operating in a triode regime) that is also part of the feedback circuit (the DC control signal is obtained with a rectifier and a filter of large time constant).

3. An automatic gain control circuit where the DC control signal obtained from a rectifier and filter is used to change the bias of oscillator active element.

amplitude-modulated link   a transmitter–receiver system that utilizes amplitude-modulation for the transmission of signal frequencies.

amplitude-shift keying (ASK)   a modulation technique in which each group of source bits determines the amplitude of the modulated carrier.

AMPS   *See* advanced mobile phone system.

AMR   *See* automated meter reading.

analog   *See* analog signal, analog data.

analog data   data represented in a continuous form with respect to continuous time, as contrasted with digital data represented in a discrete (discontinuous) form in a sequence of time instant.

analog multiplier   a device or a circuit that generates an analog output signal that is proportional to the product or multiplication of two analog input signals.

analog optical computing   optical computing that involves two-dimensional analog operations such as correlation and complex spatial frequency filtering primarily based on the property of the lens

to perform two-dimensional Fourier transform. In analog optical computing, operations to be performed are matched with and based on already known optical phenomena.

analog signal   a signal represented in a continuous form with respect to continuous time, as contrasted with digital signal represented in a discrete (discontinuous) form in a sequence of time instant. *See also* analog data.

analog signal conditioning   an interface between the sensor or transducer output, which represents an analog or physical world, and the analog-to-digital converter.

analog-to-digital A/D conversion   a method by which a continuously varying signal (voltage) is sampled at regularly occurring intervals. Each sample is quantized to a discrete value by comparisons to preestablished reference levels. These quantized samples are then formatted to the required digital output (e.g., binary pulse code words). The A/D converter is "clocked" to provide updated outputs at regular intervals. In order not to lose any baseband information, sampling must occur at a rate higher than twice the highest incoming signal frequency component. *See also* Nyquist rate.

analog-to-digital A/D converter   a device that changes an analog signal to a digital signal of corresponding magnitude. This device is also called an encoder, ADC, or A/C converter.

analysis filter   a filter in the analysis section of a sub-band analysis and synthesis system.

analysis-by-synthesis coding   refers to the class of source coding algorithms where the coding is based on parametric synthetization of the source signal at the encoder. The synthesized signal is analyzed, and the parameters that give the "best" result are chosen and then transmitted (in

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changes in the environment in which they must operate. See also Analog Computer.

Analog Recording System of recording in which music is converted into electrical impulses that form "patterns" in the grooves of phonograph record masters or in the oxide particles of master tapes representing (or analogous to) musical waveforms.

Analog Semiconductor Analog semiconductors are essentially the "translators" between the wave-form world of man (light, heat, pressure, and sound all move in waves) and the digital world ("ones" and "zeros") of computers. Analog semiconductors act as amplifiers in strengthening a weak signal, as converters to turn a signal from wave-form to digital and back again, and as voltage regulators, stepping down a signal from higher to lower power, also called power management.

Analog Signal A signal in the form of a continuous wave varying in step with the actual transmitted information; attempts to transmit an exact replica of the inputted signal down a communications channel. See Analog and all the various definitions starting with Analog.

Analog Switch Telephone switching equipment that switches signals without changing the analog form of the original phone call. The major form of analog switching is circuit switching. Most switching is now done digitally.

Analog Synchronization A synchronization control system in which the relationship between the actual phase error between clocks and the error signal device is a continuous function over a given range.

Analog Transmission A way of sending signals — voice, video, data — in which the transmitted signal is analogous to the original signal. In other words, if you spoke into a microphone and saw your voice on an oscilloscope and you took the same voice as it was transmitted on the phone line and threw that signal onto the oscilloscope, the two signals would look essentially the same. The only difference would be that the electrically transmitted signal would be at a higher frequency. Most transmission is now done digitally.

Analog Video Signals represented by an infinite number of smooth transitions between video levels. TV signals are analog. By contrast, a digital video signal assigns a finite set of levels. Because computer signals are digital, analog video must be converted into a digital form before it can be shown on a computer screen.

Analog Wireless The dominant radio transmission standard in the United States; also called AMPS.

Analogue An English/European way of spelling analog, which is the correct North American spelling. See Analog.

Anamorphic Unequally scaled in vertical and horizontal dimensions.

ANC All Number Calling. The dialing plan used in telephone networks. Consisting of all numbers, ANC replaced the old U.S. system which consisted of two letters and five numbers (2L + 5N). In other words, the GR (Greenwood) exchange became 47, PA (Pennsylvania) became 72, and UL (Ulysses) became 85. Remember the Glenn Miller hit, "Pennsylvania 6-5000?" Those old exchanges were charming, often reflecting the character of the communities to which they were assigned. However, and as the number of telephone numbers grew, we ran out of alpha prefixes that included the first two letters of meaningful words. Eventually, we had to use the 1 on the dial in the second position of the prefix; there are no letters associated with that number. Hence, All Number Calling.

ANCARA Advanced Networked Cities And Regions Association. A formal association of cities and regions exploring advanced uses of information technology. ANCARA was founded in 1996 by the regions/cities of Eindhoven (The Netherlands), Kansai (Japan), Orlando (Florida), Silicon Valley (California), Singapore, and Stockholm (Sweden). The intent is to accelerate the development of the Global Information Infrastructure (GII). www.ancara.nl. See also GII.

Ancestor Node An ATM term. A logical group node that has a direct parent relationship to a given node (i.e., it is the parent of that node, or the parent's parent.)

Anchor A hyperlinked word or group of words. An anchor is the same as a hyperlink — the underlined words or phrases you click on in World Wide Web documents to jump to another screen or page. The word anchor is used less often than hyperlink, but it maintains the seafaring theme of navigating and surfing the Net. See also Hyperlink.

Anchorage Accord A milestone ATM Forum document (April 12, 1998) so named because of the meeting location, the Anchorage Accord outlines which versions of ATM Forum specifications vendors should implement. ATM Forum specifications comprise approximately 60 baseline specifications for successful market entry of ATM products and services. Included are Broadband InterCarrier Interface (BICI), Interim Local Management Interface (ILMI), LAN Emulation (LANE), network management, Private Network Node Interface (PNNI), signaling, SMDS (Switched Multimegabit Data Service) and IP (Internet Protocol) over ATM, traffic management, and a number of physical interfaces. The accord also limits the conditions under which specifications are revised in order to cut down on future confusion. See also ATM Forum.

Anchor System A cellular term. An anchor system is the system that maintains the connection to the PSTN (Public Switched Telephone Network) during the process of call handoff from one cell site to another. In this context, a "system" comprises all of the cellular carrier's MSCs (Mobile Switching Centers) serving a particular geographic area, and all of the cell sites supported by the MSCs. See also MSC.

Ancillary Charges Charges for supplementary services comprised of optional features, which may consist of both non-recurring and monthly charges.

AND Automatic Digital Network Dialing. A digital private line service that transmits voice, data, video and other digital signals.

AND Gate A digital device which outputs a high state if either of its inputs are high.

AND Logic Gate A type of logic gate which uses AND logic. The output of an AND logic gate would consider the first and second input.

And Statement See Not Statement.

Anechoic Chamber A perfectly quiet room. A room in which sound or radio waves do not reflect off the walls. An anechoic chamber is the only place in which a speakerphone will work perfectly. The more a room resembles an anechoic chamber — i.e. lots of drapes, plush carpet, etc. — the better a speakerphone will work.

Anemometer A device which measures wind speed and direction.

Angel Investor in an early stage technology start-up. Typically an angel invests when the company is little more than an idea, a simple business plan and several management people, but rarely a full management team.

Angle Bracket The term for these two brackets < and >. These two brackets have major use in the HTML language. See HTML.

Angle Modulation Modulation in which phase angle or frequency of a sine wave carrier is varied.

Angle of Arrival AOA. A class of Position Determination Technology in which a mobile radio unit's position is calculated based on the direction of its transmitted signal measured from two or more receiving sites; also known as triangulation. Employed in certain wireless E9-1-1 solutions. See also Time Difference of Arrival.

Angle Of Deviation In fiber optics, the net angular deflection experienced by a light ray after one or more refractions or reflections. The term is generally used in reference to prisms, assuming air interfaces. The angle of deviation is then the angle between the incident ray and the emergent ray.

Angle of Incidence The angle between an incident ray and the normal to a reflecting or refracting surface.

Angled End An optical fiber whose end is deliberately polished at an angle to reduce reflections.

Angry fruit salad A terrible visual interface on a web site or a software screen that has far too many colors.

Angstrom One ten-millionth of a millimeter. Angstroms are primarily used to express electromagnetic wavelengths, including and particularly optical wavelengths. It is also called an Angstrom unit. It is named after Anders Jonas Angstrom, a Swedish astronomer and physicist, who lived 1814-74. It is said that the 128-bit addressing scheme of IPv6 provides enough unique IP addresses to theoretically provide 1,500 per square angstrom of the earth's surface.

Angular circumference The measurement of the amount of bend in a fiber-optic cable.

Angular Misalignment Loss The optical power loss caused by angular deviation from the optimum alignment of source to optical fiber — fiber-to-fiber, or fiber-to-detector.

ANI Automatic Number Identification. ANI provides for the transmission through the network of the BN (Billing Number), versus the telephone number, of the originating party (i.e., the calling person, also called party in the phone business). ANI originally was intended exclusively for the use of the long distance and local phone carriers for billing purposes. ANI information is sent through the network, from the originating central office, through all intermediate tandem offices, to the terminating central office. The information originally was sent over analog trunks in the form of DTMF (Dual Tone MultiFrequency) signals, although contemporary networks usually pass the information through the digital SS7 (Signaling System 7) network. For some years, ANI has been available to end user organizations, as well. In order to gain access to ANI data, you must have a "trunk side" con-

are used to impress people. "This page is kinda dull. Maybe a little dancing baloney will help?" This definition courtesy Wired Magazine.

Dancing frog A problem or image on your computer screen that disappears just as soon as you try to show it to someone else. The same thing seems to happen with automobiles when you take a normally troublesome car in for a checkup with the mechanic.

DAP Directory Access Protocol. The protocol used between a Directory User Agent (DUA) and Directory System Agent (DSA) in an X.500 directory system. See X.500 and LDAP.

Dark Optical fiber through which no light is currently being transmitted. See Dark Fiber.

Dark Current The flow of electricity through the diode in a photodiode when no light is present. Photodiodes are often used as light-sensitive switches. When light hits them, they turn on. Here's a more technical explanation: Dark current is the induced current that exists in a reversed biased photodiode in the absence of incident optical power. It is better understood to be caused by the shunt resistance of the photodiode. A bias voltage across the diode (and the shunt resistance) causes current to flow in the absence of light. See also Dark Fiber.

Dark Fiber Optical fiber through which no light is transmitted and which, therefore, no signal is being carried. Generally speaking, a dark fiber is one of many fibers contained within a cable. Carriers commonly deploy a large number of fibers (432 is a common number) at any given time, since the incremental cost is quite modest compared to pulling them one at a time as the need arises. In fact, a carrier often has little choice, as the right of way may be granted once, and only once. The fibers that the carrier is using immediately are "lit," and those that currently are unused are left "dark." The dark fiber is available for future use. Sometimes dark fiber is sold by a carrier without the accompanying transmission electronics. The customer, which may be either an end user organization or another carrier, is expected to light it up with his own electronics. See also Dark Current, Dim Fiber and Lit Fiber.

Dark Side At Apple trade shows, people who use Windows machines are known as being on the Dark Side.

Dark Swap Round-trip commodity trading of unused broadband — so-called dark fiber — among providers. The technique creates the appearance of trade activity. An unscrupulous carrier can book the swapping as revenue and thus make his financials look better to investors in the stockmarket. It happened in the late 1990s and early 2000s. And by the time you read this, some of the creative executives who thought this up should be sitting firmly in jail.

Dark Wavelength A Dense Wavelength Division Multiplexing (DWDM) term. Dark wavelength refers to a virtual channel in a fiber optic system utilizing DWDM. Each virtual channel is supported through a specific wavelength of light, with many such channels riding over the same fiber. Once the fiber system is deployed and the DWDM equipment is activated, some of the wavelengths may be activated immediately and others may be left dark for future needs. Such a fiber system is call "Dim Fiber," as it's neither completely dark, nor fully lit. When the need arises, those dark wavelengths are lit up. See also DWDM, Fiber, Optical Fiber and SONET.

DARPA Defense Advanced Research Projects Agency. Formerly called ARPA, it is a US government agency that funded research and experimentation with the ARPANET and later the Internet. The group within DARPA responsible for the ARPANET is ISTO (Information Systems Techniques Office), formerly IPTO (Information Processing Techniques Office). DARPA had sponsored research in the 1960s and the 1970s to create a computer network that could survive a nuclear detonation. See also DARPA Internet, IAB, IETF and Internet.

DARPA Internet World's largest internetwork, linking together thousands of networks around the world. Sponsored by U.S. Defense Advanced Research Projects Agency. Now called DARPANET. See next definition.

DARPANET Defense ARPANET. Also known as DARPA Internet. In 1983 the ARPANET was officially split into DARPANET and MILNET. World's largest internetwork, linking together thousands of networks around world. Sponsored by U.S. Defense Advanced Research Projects Agency. DARPANET was the beginnings of the Internet. See Internet.

DARS Digital Audio Radio System. Also known as DAB (Digital Audio Broadcasting) outside the U.S. Proposed satellite-delivered audio/radio systems, similar to DBS (Direct Broadcast System) TV systems, which have been enormously successful in competition with CATV. DARS has been debated by the FCC and the ITU-R since the initial application by CD Radio Inc. in 1990. Assuming that the FCC and ITU-R eventually agree on frequency assignments (and they now have), you may want to make room for one more satellite dish on your rooftop or on your car.

DAS Tape A cellular term. The magnetic tape that is used at the MTSO to record traf-

fic statistics and call billing information. This tape is sent to a third-party 'billing-house' where the actual billing of the subscribers is done.

DASD Direct Access Storage Device. Any on-line data storage device. Usually refers to a magnetic disk drive, because optical drives and tape are considered too slow to be direct access devices. Pronounced DAZ-dee. The term is said to have been invented by IBM.

DASS Direct Access Secondary Storage. Same as near-line: storage on pretty-fast storage devices (e.g., rewritable optical) that are less expensive than hard drives but faster than off-line devices.

DASS1 Digital Access Signaling. A British term. The original British Telecom (BT) ISDN signalling developed for both single line and multi-line Integrated Digital Access but used in the BT ISDN pilot service for single line IDA only.

DASS2 Digital Access Signaling System No. 2. A British Term. A message-based signalling system following the ISO-based model developed by British Telecom to provide multi-line IDA interconnection to the BT network.

DAT Digital Audio Tape used to identify a type of digital tape recorder and player as well as the tape cassette. DAT tape machines record music that is much crisper, and free of the hisses and pops that mar traditional analog recordings. The drawback with DAT tape machines is they require considerable tape to store music digitally. In a DAT machine, the music is recorded by sampling the music 48,000 times each second. Each of those samples is represented by a number that is written as a 16-digit string of zeros and ones. There are two such signals, once for each stereo channel, meaning that storing a single second of music requires about 1.5 million bits. On top of that, extra bits are added to allow the system to mathematically correct errors and help the machine automatically find a particular song on the tape. All together, according to Andrew Pollack writing in the New York Times, a single second of music on a digital audio tape requires 2.8 million bits. But compression techniques are cutting down the amount of information required to be recorded.

Data This is AT&T Bell Labs' definition: "A representation of facts, concepts or instructions in a formalized manner, suitable for communication, interpretation or processing." Typically anything other than voice.

Data Abstraction A term in object-oriented programming. An object is sometimes referred to as an instance of an abstract data type or class. Abstract data types are constructed using the built-in data types supported by the underlying programming language, such as integer and date. The common characteristics (both attributes and methods) of a group of similar objects are collected to create a new data type or class. Not only is this a natural way to think about the problem domain, it is a very efficient way to write programs. Instead of individually describing several dozen instances, the programmer describes the class once. Once identified, each instance is complete with the exception of its instance variables. The instance variables are associated with each instance, i.e., each object; methods exist only with the classes. See Object Oriented Programming.

Data Access Arrangement DAA. Equipment that allows you to attach your data equipment to the nation's phone system. At one stage, DAAs were required by FCC "law." Now, their limited functions are built into directly attached devices, such as terminals, computers, etc.

Data Access Point DAP. MCI computer that holds the number translation and call-routing information for 800 and Vnet services. These computers respond to inquiries from MCI switches on how to handle these calls.

Data Arrangement In public switched telephone networks, a single item or group of items present at the customer's premises, including all equipment that may affect the characteristics of the interface. An obsolete term. Historically, it came from the time when the phone industry insisted on an interface between its lines and equipment provided by others.

Data Attribute A characteristic of a data element such as length, value, or method of representation.

Data Bank A collection of data in one place. The data is not necessarily logically related, nor is it necessarily consistently maintained. See Database.

Data Base See Database, which is our preferred spelling.

Data Broadcasting A method of high speed data distribution for text and graphics which uses the spare capacity in the broadcasting television, cable and satellite transmission systems.

Data Bubble A new organization within BellSouth to provide high-speed digital services. No one seems to know why it's called "Data Bubble," except that someone inside BellSouth clearly thinks the term is cute.

Data Burst Burst transmission.

Digital Multiplex Hierarchy

ly were of this type before VGA models appeared. Digital monitors do not have as wide a range of color choices as analog types; digital EGA monitors, for example, can display just 16 colors out of a palette of 64.

Digital Multiplex Hierarchy An ordered scheme for the combining of digital signals by the repeated application of digital multiplexing. Digital multiplexing schemes may be implemented in many different configurations depending upon the number of channels desired, the signaling system to be used, and the bit rate allowed by the communication medium. Some currently available multiplexers have been designated as D1-, DS-, or M-series, all of which operate at T-carrier rates. Extreme care must be exercised when selecting equipment for a specific system to ensure interoperability, because there are incompatibilities among manufacturers' designs (and various nations' standards).

Digital Multiplexed Interface A ISDN PRI-like connection between a PBX and a computer, developed by AT&T.

Digital Multiplexer A device for combining digital signals. Usually implemented by interleaving bits, in rotation, from several digital bit streams either with or without the addition of extra framing, control, or error detection bits. In short, equipment that combines by time division multiplexing several signals into a single composite digital signal.

Digital Nervous System Coined by Bill Gates in 1997, the best definition of this term came from an interview between Gary Reiner, GE's chief information officer and a reporter from the Economist. According to the magazine, "Mr Reiner heads the company's most important initiative: 'digitising' as much of its business as possible. That not only means buying and selling most things online but, more importantly, setting up a digital nervous system that connects in real time anything and everything involved in the company's business: IT (Information Technology) systems, factories and employees, as well as suppliers, customers and products.

Digital Network A network in which the information is encoded as a series of ones and zeros rather than as a continuously varying wave — as in traditional analog networks. Digital networks have several major pluses over analog ones. First, they're "cleaner." They have far less noise, static, etc. Second, they're easier to monitor because you can measure them more easily. Third, you can typically pump more digital information down a communications line than you can analog information.

Digital Network Architecture. DNA. The data network architecture of Digital Equipment Corporation (DEC), now part of Compaq Corporation.

Digital Phase-Locked Loop A phase-locked loop in which the reference signal, the controlled signal, or the controlling signal, or any combination of these, is in digital form.

Digital Phase Modulation The process whereby the instantaneous phase of the modulated wave is shifted between a set of predetermined discrete values in accordance with the significant conditions of the modulating digital signal.

Digital Plastic A fancy term for buying goods and services on-line over the Internet using your credit card, possibly in conjunction with some verification of who you are from an independent certification authority.

Digital Port Adapter DPA. A device which provides conversion from the RS-449/422 interface to the more common interfaces of RS-232-C, V.35, WE-306 and others.

Digital Private Network Signaling System See DPNSS.

Digital Pulse Origination DPO. Equipment that sends dialed digits consisting of tones or pulses. It may be used at the central office end of a DID service connection.

Digital Pulse Termination DPT. Equipment that receives and processes dialed digits consisting of tones or pulses. It may be used at the customer end of a DID service connection.

Digital Radio Broadcasting DRB. Radio transmission intended for general reception in the form of discrete, integral values.

Digital Radio Concentrator System DRCS. A digital radio system which transmits data via a device which connects a number of circuits, which are not all used at once, to a smaller group of circuits for economy.

Digital Recording A system of recording by conversion of musical information into a series of pulses that are translated into a binary code intelligible to computer circuits and stored on magnetic tape or magnetic discs. Also called PCM - Pulse Code Modulation.

Digital Reference Signal DRS. A digital reference signal is a sequence of bits that represents a 1004-Hz to 1020-Hz signal.

Digital Selective Calling DSC. A synchronous system developed by the International Radio Consultative Committee (CCIR), used to establish contact with a station

or group of stations automatically by radio. The operational and technical characteristics of this system are contained in CCIR Recommendation 493.

Digital Sequence Spread Spectrum A wireless term. An RF (radio frequency) modulation technique, which uses algorithms to code transmissions in sequential channels and then decode them at the other end.

Digital Service Cross-Connect DSX. A termination/patch panel that lets DS1 and DS3 circuits be monitored by test equipment.

Digital Set-Top Box A device that hooks up to a TV and can collect, store, and display digitally compressed TV signals. See also Digital Cable Set Top Box.

Digital Signal A discontinuous signal. One whose state consists of discrete elements, representing very specific information. When viewed on an oscilloscope, a digital signal is "squared." This compares with an analog signal which typically looks more like a sine wave, i.e. curvy. Usually amplitude is represented at discrete time intervals with a digital value.

Digital Signal Cross-Connect DSX. Also known variously as a DACS (Digital Access Cross-Connect System) and a DCC (Digital Cross-Connect), a DSX is a device that is used to connect digital circuits together. A DSX-1 interconnects DS-1 (T-1 or E-1) circuits, as DSX-2 interconnects DS-2 (T-2 or E-2) circuits, and a DSX-3 interconnects DS-3 circuits (T-3 or E-3). Digital Signal Level DS-n. A hierarchical arrangement of digital signals used in North America beginning with DS-0 (64 Kbps) up to DS-4 (274 Mbps).

Digital Signal Processor A digital signal processor is a specialized semiconductor device or specialized core in a semiconductor device that processes very efficiently and in real time a stream of digital data that is sampled from analog signals ranging from voice, audio and video and from cellular and wireless to radio and television. As opposed to a general-purpose processor, a DSP is often designed to solve specific processing problems. A DSP architecture focuses on algorithmic efficiency and may use an instruction set that is more or less tailored toward the problem the DSP is solving. General purpose processors, on the other hand, may sacrifice algorithmic efficiency for general-purpose capability and push clock-speed to achieve performance. A DSP typically has much greater mathematical computational abilities than a standard microprocessor. In some applications, like wireless, PDAs and cell phones, constraints on power consumption require performance improvements other than faster clock speed. In other applications, like cellular base stations and high definition TV, where the number of channels or the high data rate require signal processing capabilities an order of magnitude greater than general purpose processors, a DSP that uses processing parallelism can provide much higher performance much more efficiently than even the fastest general-purpose processor. A DSP often performs calculations on digitized signals that were originally analog (e.g. voice or video) and then sends the results on. There are two main advantages of DSPs — first, they have powerful mathematical computational abilities, more than normal computer microprocessors. DSPs need to have heavy mathematical computation skills because manipulating analog signals requires it. The second advantage of a DSP lies in the programmability of digital microprocessors. Just as digital microprocessors have operating systems, so DSPs have their very own operating systems. DSPs are used extensively in telecommunications for tasks such as echo cancellation, call progress monitoring, voice processing and for the compression of voice and video signals as well as new telecommunications applications such as wireless LANs and next-generation cellular data and cellular Internet services . They are also used in devices from fetal monitors, to anti-skid brakes, seismic and vibration sensing gadgets, super-sensitive hearing aids, multimedia presentations and desktop fax machines. DSPs are replacing the dedicated chipsets in modems and fax machines with programmable modules — which, from one minute to another, can become a fax machine, a modem, a teleconferencing device, an answering machine, a voice digitizer and device to store voice on a hard disk, to a proprietary electronic phone. DSP chips and DSP cores in custom chips are already doing for the telecom industry what the general purpose microprocessor (e.g. Intel's Pentium) did for the personal computer industry. DSP chips are made by Analog Devices, AT&T, Motorola, NEC and Texas Instruments, among others. DSP cores are made by BOPS, DSP Group, Infineon and others.

Digital Signature A digital signature is the network equivalent of signing a message so that you cannot deny that you sent it and that the recipient knows it must have come from you. In short, a digital signature is an electronic signature which cannot be forged. It verifies that the document originated from the individual whose signature is attached to it and that it has not been altered since it was signed. There are two types of digital signatures. Ones you encrypt yourself and are the result of an ongoing relationship between you and the other party. Second, there are encrypted certificates issued by a com-

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REVISED AND UPDATED

Rudolf F. Graf

GLOBAL ReLeaf 2000 Butterworth-Heinemann supports the efforts of American Forests and the Global ReLeaf program in its campaign for the betterment of trees, forests, and our environment.

waveshape of random noise and its amplitude is directly proportional to the bandwidth of the transmission system.

amplitude permeability — The relative permeability at a stated value of field strength and understated conditions, the field strength varying periodically with time and no direct magnetic-field component being present.

amplitude range — The ratio, usually expressed in decibels, between the upper and lower limits of program amplitudes that contain all significant energy contributions.

amplitude resonance — The condition that exists when any change in the period or frequency of the periodic agency (but not its amplitude) decreases the amplitude of the oscillation or vibration of the system.

amplitude response — The maximum output amplitude that can be obtained at various points over the frequency range of an instrument operated under rated conditions.

amplitude selection — The process of selecting that portion of a waveform which lies above or below a given value or between two given values.

amplitude separator — A television-receiver circuit that separates the control impulses from the video signal.

amplitude-shift keying — Abbreviated ask. The modulation of digital information on a carrier by changing the amplitude of the carrier.

amplitude-suppression ratio — In frequency modulation, the ratio of the magnitude of the undesired output to the magnitude of the desired output of an FM receiver when the applied signal is simultaneously amplitude and frequency modulated. Generally measured with an applied signal that is amplitude modulated 30 percent at a 400-hertz rate and is frequency modulated 30 percent of the maximum system deviation at a 1000-hertz rate.

amplitude versus frequency distortion — Distortion caused by the nonuniform attenuation or gain of the system, with respect to frequency under specified terminal conditions.

AM rejection ratio — The ratio of the recovered audio output produced by a desired FM signal with specified modulation, amplitude, and frequency to that produced by an AM signal, on the same carrier, with specified modulation index.

AM suppression — The ability of an FM tuner to reject AM signals. Expressed in decibels, it is the ratio between the tuner output with a 100-percent modulation FM signal to its output with a 30-percent modulated AM signal.

AM tuner — A device capable of converting amplitude-modulated signals into low-level audio frequencies.

amu — Abbreviation for atomic mass unit.

analog — 1. In electronic computers, a physical system in which the performance of measurements yields information concerning a class of mathematical problems. 2. Of or pertaining to the general class of devices or circuits in which the output varies as a continuous function of the input. 3. The representation of numerical quantities by means of physical variables, e.g., translation, rotation, voltage, resistance; contrasted with *digital*. 4. A continuous representation of phenomena in terms of points along a scale, each point merging imperceptibly into the next. An analog voltage, for example, may take any value. Real-world phenomena, such as heat and pressure, are analog (compare with *digital*).

analog adder — An analog circuit or device that receives two or more inputs and delivers an output that is equal to their sum.

analog amplifier — A device whose output is continuously proportional to the input stimulus.

analog channel — A computer channel in which the transmitted information can have any value between the defined limits of the channel.

analog circuit — A circuit in which the output varies as a continuous function of the input, as contrasted with digital circuits.

analog communications — A system of telecommunications employing a nominally continuous electrical signal that varies in frequency, amplitude, etc., in some direct correlation to nonelectrical information (sound, light, etc.) impressed on a transducer.

analog computer — 1. A computer operating on the principle of creating a physical (often electrical) analogy of the mathematical problem to be solved. Variables such as temperature, light, pressure, distance, angle, shaft speed, or flow are represented by the magnitude of a physical phenomenon such as voltage or current. The computer manipulates these variables in accordance with the mathematical formulas "analogued" on it. 2. A computer system in which both the input and output are continuously varying signals. 3. A computing machine that works on the principle of measuring, as distinguished from counting. 4. A computer that solves problems by setting up equivalent electric circuits and making measurements as the variables are changed in accordance with the corresponding physical phenomena. An analog computer gives approximate solutions, whereas a digital computer gives exact solutions. 5. A nondigital computer that manipulates linear (continuous) data to measure the effect of a change in one variable on all other variables in a particular problem. (Compare: *digital computer*.)

analog computing — Computing system in which continuous signals represent mechanical (or other) parameters.

analog data — 1. A physical representation of information such that the representation bears an exact relationship to the original information. The electrical signals on a telephone channel are an analog data representation of the original voice. 2. Data represented in a continuous form, as contrasted with digital data represented in a discrete (discontinuous) form. Analog data is usually represented by physical variables, such as voltage, resistance, rotation, etc.

analog input module — An I/O rack module that converts an analog signal from a user device to a digital signal that may be processed by the processor.

analog meter — An indicating instrument that employs a movable coil and pointer arrangement (or equivalent) to display values along a graduated scale.

analog multiplexer — 1. Circuit used for time-sharing of analog-to-digital converters between a number of different analog information channels. Consists of a group of analog switches arranged with inputs connected to the individual analog channels and outputs connected in common. 2. Two or more analog switches with separate inputs and a common output, with each gate separately controllable. Multiplexing is performed by sequentially turning on each switch one at a time, switching each individual input to a common output. 3. A device that selects one of several analog signals according to a digital code. Analog multiplexers (amux) are available in many forms; their chief application is as a front end in data-acquisition systems, enabling a single analog-to-digital converter to monitor more than one information channel.

analog network — A circuit or circuits that represent physical variables in such a manner as to permit the expression and solution of mathematical relationships between the variables, or to permit the solution directly by electric or electronic means.

task. Instructions and data are stored in the same memory and both can be manipulated by the computer with equal ease. 8. A device that is capable of solving problems or manipulating data by accepting data, performing prescribed operations (mathematical or logical) on the data, and then delivering or applying the results of these operations.

computer access device input — A device that automatically routes to the computer all teletypewriter observation reports that are received in a standard format.

computer-aided design — *See* CAD.

computer-aided engineering — Abbreviated CAE. An umbrella term that covers all uses of computers in engineering applications. Thus, computer-aided design and computer-aided manufacturing are branches of computer-aided engineering. The subject area is not usually considered to include software engineering.

computer-aided manufacturing — Abbreviated CAM. The use of computer technology to manage, control, and operate manufacturing either through direct or indirect computer interface with the physical and human resources of the company.

computer-aided software engineering — *See* CASE.

computer-aided tomography — *See* CAT.

computer architecture — That set of a computer's attributes (such as registers, addressing modes, and instruction set) that are visible to the programmer.

computer assisted tomography — *See* CAT.

computer code — Also called machine language. The code by which data is represented within a computer system. An example is binary-coded decimal.

computer control — The parts of a digital computer that have to do with the carrying out of instructions in the proper sequence, the interpretation of each instruction, and the application of signals to the arithmetic unit and other parts in accordance with this interpretation.

computer control counter — 1. A counter that stores the next required address. 2. Any counter that provides information to the control unit.

computer diagnosis — The use of data processing systems for evaluation of raw data.

computer entry punch — A combination card reader and keypunch used to enter data directly onto the memory drum of a computer.

computer-generated hologram — A synthetic hologram produced using a computer plotter. The binary structure is formed on a large scale and is then photographically reduced. The holograms are finally etched into a medium.

computer graphics — 1. Computer output in the form of pictorial representation (graphs, charts, drawings, etc.) that is displayed visually, usually by a cathode-ray tube. 2. A person-oriented system that uses a computer to create, transform, and display pictorial and symbolic data.

computer-integrated manufacturing — *See* CIM.

computer interface — 1. Peripheral equipment for attaching a computer to scientific or medical instruments. 2. A device designed for data communication between a central computer and another unit such as a PC processor.

computer interfacing — The synchronization of digital data transmission between a computer and one or more external I/O devices.

computerized axial tomograph — *See* CAT.

computerized robot — A servo model run by a computer. The computer controller does not have to be taught by leading the arm-gripper through a routine: new instructions can be transmitted electronically. The programming for such "smart" robots may include the ability to optimize, or improve, its work-routine instructions.

computer language — 1. A system of commands used to develop software for computers (e.g., DOS). 2. The method or technique used to instruct a computer to perform various operations. *See* high-level language; machine language.

computer-limited — Having to do with the condition in which the time required for computation is greater than the time required to read inputs and write outputs.

computer literacy — 1. Computer and information system comprehension. 2. The ability to use computer technology in a particular discipline.

computer network — Two or more connected computers that have the ability to exchange information.

computer numerical control — Abbreviated CNC. The use of a dedicated computer within a numerical-control unit to perform some or all of the basic numerical-control functions.

computer-output microfilm printer — Abbreviated COM printer. A microfilm printer that will take output directly from the computer, thus substituting for line printer or tape output.

computer polarization holography — A technique used to store wavefront information on thin polarization information-recordable materials (i.e., photochromic crystals) by controlling the polarization angle of a small illuminating spotlight in each sampling cell on a crystal.

computer port — The physical location at which the communication line interfaces to the computer.

computer program — A series of instructions or statements prepared in a form acceptable to the computer, the purpose of which is to achieve a certain result. *See* software.

computer programmer — A person who designs, writes, debugs, and documents computer programs.

computer programming language — A set of precisely defined structures and syntax (representation, conventions, and rules of use and interpretation) devised to simplify communication with a computer, such as BASIC, FORTRAN, C++, and Java. The greater the power of a higher-level language, the greater is the complexity of information that can be precisely conveyed in an efficient manner.

computer science — 1. The field of knowledge that involves the design and use of computer equipment, including software development. 2. The science of solving problems with computers.

computer system — The computer and its attached peripherals, such as disk drives, monitor, keyboard, and printer.

computer tape — A high-quality magnetic digital recording tape that must be rated at 1600 fci (flux changes per inch) or 530 flux changes per centimeter, or greater.

computer terminal — Peripheral computer equipment for entering and retrieving data. Sometimes incorporates cathode-ray tube for display.

computer user tape system — *See* CUTS.

computer utility — A network of central computers linked through data communications facilities to remote terminal systems.

computer word — A sequence of bits or characters that is treated as a unit and that can be stored in one computer location. Same as machine word.

computing — Performing basic and more involved mathematical processes of comparing, adding, subtracting, multiplying, dividing, integrating, etc.

computing device — Any electronic device or system that generates and uses timing signals or pulses of more than 10,000 pulses (cycles) per second and uses digital techniques; inclusive of telephone equipment that uses digital techniques or any device or system that generates

DASD — Abbreviation for direct-access storage device. Any storage device utilizing addressing to let users enter or retrieve data without reference to their physical location. For example, a RAM.

dash — Term used in radiotelegraphy. It consists of three units of a sustained transmitted signal followed by one unit during which no signal is transmitted.

dashpot — 1. A device using a gas or liquid to absorb energy from or retard the movement of the moving parts of a circuit breaker or other electrical or mechanical device. 2. A cylinder and piston device using gas or a liquid to retard the movement of a relay or circuit breaker.

DAT — *See* digital audio tape.

data — 1. A general term used to denote any or all numbers, letters, symbols, or facts that refer to or describe an object, idea, condition, situation, or other factors. It connotes basic elements of information that can be processed or produced by a computer. Sometimes *data* is considered to be expressible only in numerical form, but *information* is not so limited. 2. A general term for any type of information. 3. Inputs in the form of a character string that may have significance beyond their numerical meaning. 4. Any representations, such as characters or analog quantities, to which meaning might be assigned.

data access arrangement — A protective connecting arrangement that serves as an interface between a customer-provided modem and the switched network. *See* DAA.

data acquisition — 1. The process by which events in the real world are translated to machine-readable signals. The term usually refers to automated systems in which sensors of one type or another are attached to machinery. 2. The simultaneous collection of data from external sensors, usually in analog form. 3. The function of obtaining data from sources external to a computer system, converting it to binary form, and processing it.

data acquisition and control systems — Assemblies of electronic and mechanical components used to monitor and control complex processes. These systems include the following:

- Process sensors that measure such parameters as temperature, pressure, voltage, and current
- Transmitters that convert measurement data to electrical or pneumatic signals and controls
- Digital computers that test set points, program sequential events, and perform calculations
- Software that provides the computer with instructions and routines
- Process actuators, such as solenoids, relays, valves, and motors, that modify the process in response to computer-generated commands
- Process interface devices, such as analog-to-digital converters, that link transmitters and actuators with digital computers
- Human interface devices, such as printers, keyboards, CRT terminals, switches, alphanumeric displays, chart recorders, and alarms, that facilitate human intervention

data acquisition and conversion system — A method of processing analog signals and converting them into digital form for subsequent processing or analysis by computer or for data transmission.

data acquisition system — 1. A system in which a computer at a central computing facility gathers data from multiple remote locations. 2. System for recording data, usually in digital form, from several sources; can include computing functions.

data bank — A comprehensive collection of libraries of data. For example, one line of an invoice may form an item, a complete invoice may form a record, a complete set of such records may form a file, the collection of inventory control files may form a library, and the libraries used by an organization are known as its data bank. Synonymous with database.

database — Also data base. 1. The entire body of data that has to do with one or more related subjects. Typically, it consists of a collection of data files (such as a company's complete personnel records concerning payroll, job history, accrued vacation time, etc.) stored in a computer system so that they are readily available. 2. A block of computer memory containing information about one given thing. 3. The collection of current variable data elements defined and maintained by the user. 4. A collection of data, consisting of at least one file, that is sufficient for a given purpose or for a given data-processing system. 5. A large and complete collection of information that covers a variety of subject areas. For instance, a medical diagnostic database might contain symptoms for all common diseases or injuries. 6. A collection of data fundamental to a system or to an enterprise. Made up of comprehensive files of information having predetermined structure and organization and able to be communicated, interpreted, or processed by humans or by automatic means. 7. A collection of related data that can be retrieved from memory at will, such as a mailing list or a list of accounts.

database management — 1. A systematic approach to the storage, updating, and retrieval of information stored as data items, usually in the form of records in a file, where many users, or even many remote installations, will use common data banks. 2. A program that enables a computer to store large amounts of information and then sort it in almost any manner. For example, a company's database could give a list of customers by ZIP code, by credit line, alphabetically by name, or by telephone number. The program takes care of managing the storage and retrieval of the data.

database management system — Abbreviated DBMS. A group of programs that allow users to store, alter, and retreive information from a database.

database relations — Linkages within a database that logically bind two or more elements in the database. For example, a nodal line (interconnect) is related to its terminal connection nodes (pins) because they all belong to the same electrical net.

data block — Typically, all the data for one item that is entered into a computer for processing, or the computer output that results from processing. An example of an input data block is an individual shipping list; an example of an output data block is a check to be sent.

data break — A facility that permits input/output transfers to take place on a cycle-stealing basis without disturbing execution of the program by a computer.

data bus — 1. A wire or group of wires used to carry data to or from a number of different locations. 2. The output pins of the MPU chip and associated circuitry used for the transmission of data from one point in the system to another. 3. In fiber optics, an optical waveguide used as a common trunk line to which a number of terminals can be interconnected through optical couplers. 4. A system incorporated into fiber-optic communications characterized by several spatially distributed terminals that are served with the same multiplexed signal.

data catalog — A software tool used to list all of the data elements in a database.

data channel (or communication) equipment — Abbreviated DCE. Equipment that interfaces a transmission facility to a transmitting/receiving device. A modem is a DCE.

data code — A structured set of characters used to stand for the data items of a data element, for example,

processes of addition, subtraction, multiplication, and division. 3. A computer system in which circuit operation is based on specific signal levels. In a binary digital computer, there are two such signal levels, one at or near zero and the other at a defined voltage. 4. A device that performs sequences of arithmetic and logic operations on discrete data. 5. A type of data-processing equipment that counts, utilizing numbers to express the values and quantities. General-purpose digital computers include central storage units and peripheral control units and are designed to solve a wide class of problems. A common feature of general-purpose equipment is the ability to externally modify the program of instructions. Special-purpose digital computers are not intended for a typical commercial physical environment and include rugged computers for military and space applications. An analog computer measures cost or conditions. Hybrid computers utilize both modes. 6. A computer that solves problems by operating on discrete representing variables by performing arithmetic and logic processes on this data.

digital data — 1. Data represented in discrete, discontinuous form, as contrasted with analog data represented in continuous form. Digital data is usually represented by means of coded characters (e.g., numbers, signs, symbols, etc.). 2. Any data that is expressed in digits. The term usually implies the use of binary digits.

digital data-handling system — The electronic equipment that receives digital data, operates on it in a suitable manner, records it in a suitable manner on a suitable medium, and presents it directly to a computer or a display.

digital delay line — *See* active delay line.

digital delay module — *See* active delay line.

digital delay unit — *See* active delay line.

digital device — 1. Typically, an IC that switches between two exclusive states or levels, usually represented by logical 1 or 0. 2. An electronic device that processes electrical signals that have only two states, such as on or off, high or low voltages, or positive or negative voltages. In electronics, *digital* normally means binary or two-state.

digital differential analyzer — A special-purpose digital computer that performs integration and that can be programmed for the solution of differential equations in a manner similar to that of an analog computer.

digital disc recording — An analog disc recording that has been made from a master tape recording that was digitally recorded.

digital filter — 1. A linear computation or algorithm performed on a selected series in the form of an input signal that produces a new series as output. The computational device may be a specifically designed electronic system or a conventional computer. 2. Network that operates on discrete samples of a signal to achieve a desired transfer-function operation on that signal. Digital filters divide into two classes: nonrecursive filters produce an output that is a function of only the previous and present inputs; recursive filters produce an output that is a function of both the past and present inputs and outputs.

digital filtering — 1. A computational process or algorithm by which a sampled signal or sequence of numbers, acting as input, is transformed into a second sequence of numbers called the output. The computational process may correspond to high-pass, low-pass, bandpass, or bandstop filtering, integration, differentiation, or something else. The second sequence can be used for further processing, as in a fast-Fourier-transform analyzer, or it can be converted to an analog signal, producing a filtered version of the original analog signal. 2. The process of smoothing, spectrally shaping, or removing noise from a signal. Digital filters are basically mathematical functions

that are performed on the digital data stream; their characteristics can be altered under software control, which adds to their overall flexibility. Finite impulse response (FIR) and infinite impulse response (IIR) are examples of digital filter functions.

digital frequency monitor — A special-purpose digital counter that permits a train of pulses to pass through a gate for a predetermined time interval, counts them, and indicates the number counted.

digital harmonic generation — Abbreviated DHG. The use of circuit elements whose outputs are discontinuous functions of their inputs to produce signals that are an integral multiple of the (fundamental) input signal.

digital image analysis — Technology to measure and standardize the output of a computer-interfaced vidicon system.

digital imaging — The process by which an image that is in electronic form (e.g., a bit-mapped graphic) is altered.

digital information display — The presentation of digital information in tabular form on the face of a digital information display tube.

digital integrated circuit — 1. A switching-type integrated circuit. 2. An integrated circuit that processes electrical signals that have only two states, such as on or off, high or low voltages, or positive or negative voltages. In electronics, *digital* normally means binary or two-state. 3. A monolithic group of logic elements. May be small-scale integration (e.g., SSI gates, flip-flops, latches), medium-scale integration (e.g., MSI decoders, adders, counters), or large-scale integration (e.g., LSI memories, microprocessors). 4. A class of integrated circuits that processes digital information (expressed in binary numbers). The processing operations are arithmetic (such as addition, subtraction, multiplication, and division) or logical (in which the circuit senses certain patterns of input binary information and indicates the presence or absence of those patterns by appropriate output binary signals).

digital integrator — Device for summing or totalizing areas under curves that gives numerical readout. *See also* integrator.

digital logic modules — Circuits that perform basic logic decisions (AND, OR, NOT); used widely for arithmetic and computing functions, flip-flops, half-adders, multivibrators, etc. *See also* logic system.

digitally programmable oscillator — A voltage-controlled oscillator designed to accept a digital tuning word instead of the usual analog signal. Internal digital-to-analog (d/a) converter circuits transform the digital input to an analog voltage. Tuning-curve linearization is usually accomplished through a digital memory. The frequency speed is primarily limited by the d/a circuits.

digital modulation — A method of transmitting human voice or other analog signals using a binary code (0s and 1s). Digital transmission offers a cleaner signal than analog technology.

digital multimeter — Abbreviated DMM. A test instrument used to measure voltage, current, and resistance. The readout of measured values is shown on a digital display which is typically a liquid crystal display (LCD).

digital optical processing — The scanning of photographs or transparencies of images, either by a vidicon camera or flying-spot scanner, for the conversion of the images to digital form for storage on magnetic tape.

digital output — An output signal that represents the size of a stimulus or input signal in the form of a series of discrete quantities that are coded to represent digits in a system of numerical notation. This type of output is to be distinguished from one that provides a continuous output signal.